

NATURAL GAS INFRASTRUCTURE RELIABILITY

Description

The purpose of the Natural Gas Infrastructure Reliability Program is to provide research and technology development to ensure the reliability, integrity, and security of the Nation's gas transmission, distribution, and storage network. This program addresses the President's concern, raised in the 2001 National Energy Policy, that the country must repair and expand our energy infrastructure. The program builds on the National Energy Technology Laboratory's (NETL's) existing gas storage program and integrates the research capabilities of the natural gas industry, universities, DOE national labs, and other government organizations.

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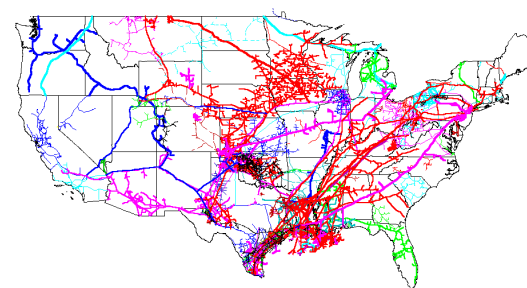
STRATEGIC CENTER FOR NATURAL GAS WEBSITE

www.netl.doe.gov/scng

Background

Reliability of the natural gas transmission and distribution network across the United States is essential to national security - providing clean, affordable energy for our homes, businesses, and industries. A number of factors, including an aging infrastructure, increased energy demand, increased reliance on gas-generated electricity, utility deregulation and restructuring, and intense competition, have put stress on the existing infrastructure. Technology development is necessary to ensure a continued high level of integrity and reliability. Significant market-driven reductions in private sector R&D have contributed to concern over the existing gas infrastructure across the United States.

U.S. Natural Gas Pipelines



Annual natural gas consumption in the U.S. is projected to exceed 35 trillion cubic feet (tcf) by 2020, increasing from 21 tcf in 1998, and the electric generation demand for natural gas is expected to triple.¹ This increased demand will require a significant expansion of the existing infrastructure. To accommodate this 50% increase in gas consumption, the Strategic Center for Natural Gas (SCNG) has set goals for the next ten years that include:

- Develop remote monitoring technology to minimize 3rd party damage and increase security.
- Develop automated remote leak detection devices to minimize leaks and enhance safety.
- Develop platforms, sensors, and repair technologies that allow rapid identification, analysis, and repair of pipe defects.
- Demonstrate next-generation instrumentation to accelerate automation and boost system efficiencies and capacities.
- Evolve existing technologies to more quickly impact reliability, integrity, and security.



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The integrity and reliability of the gas infrastructure may be the most critical challenge to achieving a substantial increase in gas deliverability given the age of existing pipelines, uncertain regulatory climate, and required lead times for new pipeline construction. Advances in materials, tools, and technologies are needed to maintain the current pipeline capacity and to expand for future consumer demands.

Infrastructure Reliability Program

DOE's Infrastructure Reliability Program is driven by:

- Availability of clean, affordable energy as a prerequisite to national energy security.
- Natural gas accounting for about one-fourth of the total U.S. energy consumption.
- Domestic natural gas offsetting increases in U.S. dependence on petroleum imports.
- Competition causing the gas industry to reduce basic and applied R&D.
- Need for a public benefit R&D program focused on natural gas infrastructure.
- Natural gas as a partial solution to greenhouse gas emission reductions.

DOE's Office of Fossil Energy and NETL, are collaborating with all sectors of the gas industry, from suppliers to end-users. Together, they are identifying factors that affect reliability, and are focusing on R&D efforts that maintain and enhance the consistent reliability to which U.S. consumers are accustomed.

The Program has made significant progress. In May 2000, a unique cross-section of gas, electric, and energy executives convened to identify the most critical market, business, regulatory, and technology issues affecting future gas supply and demand. This was followed by a June 2000 workshop in which technology and research managers outlined a roadmap to address those issues, and recommended R&D priorities for public sector action. The stage was set for R&D implementation.

In May 2001, the Secretary of Energy announced the first-ever DOE projects on natural gas infrastructure research. Eleven government-industry projects were awarded to develop high-tech approaches to improve the safety and performance of the Nation's pipeline network. Included in that array of innovations were new types of miniature robots and other sophisticated detection devices to pinpoint leaks or corrosion in pipelines. One project will develop an automated warning system to prevent nearby digging from damaging buried pipelines. Another project will study how a natural pepper extract might prevent corrosion in a pipeline. Eight of DOE's national laboratories actively participate with private industry in developing these technologies.

In October 2001, DOE announced ten additional cost-shared projects that will develop cutting-edge automation, new sensors and leak detectors, corrosion monitors, and other advanced devices that will improve the way natural gas is transported through tomorrow's transportation and delivery infrastructure.



Miniature robots are used to detect leaks or corrosion in pipelines

Looking Toward the Future

NETL is collaborating with the U.S. Department of Transportation and state governments, as well as industry and academia. NETL interacts with important stakeholder organizations such as the American Gas Association, the American Public Gas Association, the Gas Technology Institute, the Interstate Natural Gas Association of America, and the Pipeline Research Council, Inc.

The SCNG will continue to coordinate this Program with industry and other stakeholders to identify projects and to set priorities that will ensure national energy security. The SCNG plans to perform cost-benefit analyses and implement viable developmental technologies, and will also continue to investigate new sources of technologies, such as military spin-offs.

¹ Annual Energy Outlook 2001